> *Cell Culture*
> *Twin Control System*
> *Economical and Efficient Choice*

BIOREACTOR

BR100-C2

Twin-Vessel Bioreactor for Cell Culture and Process Development

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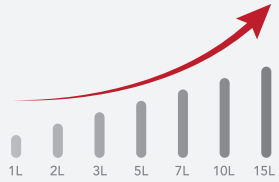
Quick Overview of BR100-C2

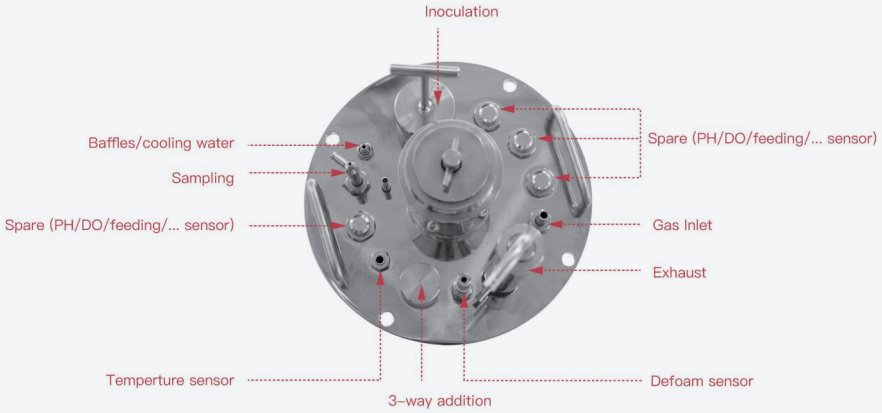
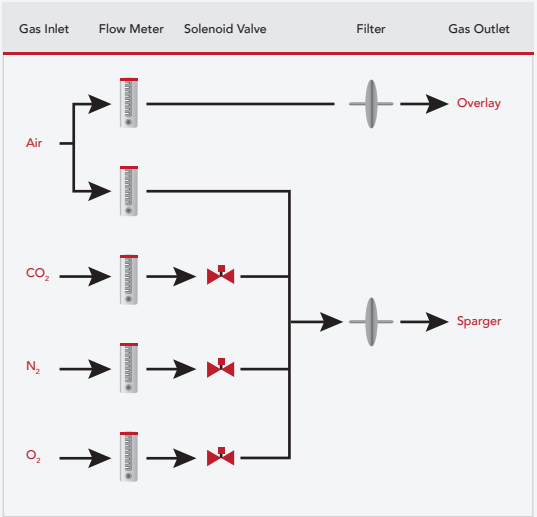
- Cost-effective and non-redundant: Standardized solution for cell culture.
- Versatile dual-vessel control: Enables simultaneous operation of two vessels of the **same or different sizes** for diverse bioprocessing needs.
- Versatile total volumes: **7 options from 1L to 15L for diverse scales.**



- Flexible customization: Extensive upgrades and bespoke solutions for special needs.
- Mature vessel manufacturing process: easy to disassemble, maintain and clean.

- Reliable performance and precise control: Core hardware from leading international brands ensures stability.
- Quick installation and easy to use: small footprint and easy installation.
- Powerful software functions: Full control via feedback, time, conditions, scripts, etc.
- Supports recipe sharing, synchronized comparison of parameter curves, and synchronized setting and control of parameters.
- Intuitive interface: 10.1-inch touch screen with graphical design language.
- Remote communication: Wired and wireless LAN for remote monitoring and control.

At-a-Glance BR100-C2 Configuration

Controller	Siemens PLC + 10.1-inch MCGS HMI; Remote monitoring and control within LAN
Glass Vessel	Total volume 1-15 L with 25~75% working volume, autoclavable; Single-wall flat-bottom cylindrical vessel, borosilicate 3.3 glass, electrolytically polished SUS 316L; With pH, DO, temp., foam electrode interface, sparger, exhaust port, inoculation port, feeding port, sampling port, etc.  * smart layout by volume
Agitation	Bottom magnetic stirring, servo motor, 5-1000r pm;Comb type defoaming impeller; Elephant-ear impeller  
Gas Intake	Each vessel: 4-way supply (Air + O_2 + N_2 + CO_2), 1 overlay + 1 ring sparger, max. 1 vvm - Air: rotameter - O_2 + N_2 + CO_2: rotameter + solenoid valve 
Exhaust	Exhaust condenser
Sensor	Hamilton® pH; Hamilton® DO; German JUMO Pt100 RTD; Foam
Pump	Each vessel: 4 fixed-speed peristaltic pump for acid, alkali, defoamer and feed

Features

Performance Meets Affordability with Uncompromised Quality

- The BR100-C2 bioreactor is developed based on years of industry experience and customer feedback, offering a simple yet efficient design that balances performance and cost.
- It features top-class components from trusted brands like Siemens, Hamilton, and Jumo, ensuring reliable, continuous monitoring and stable operation through-out the biological process.
- The combination of rotameters, solenoid valves and built-in integrated peristaltic pumps achieves essential gas and feeding control.
- Its compact design minimizes space usage, making the most efficient use of laboratory space while boosting high perfor-mance and functionality.

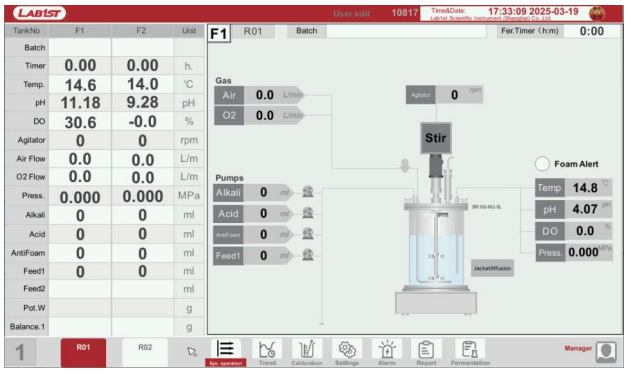
Simple Operation and Hassle-Free Mainte-nance

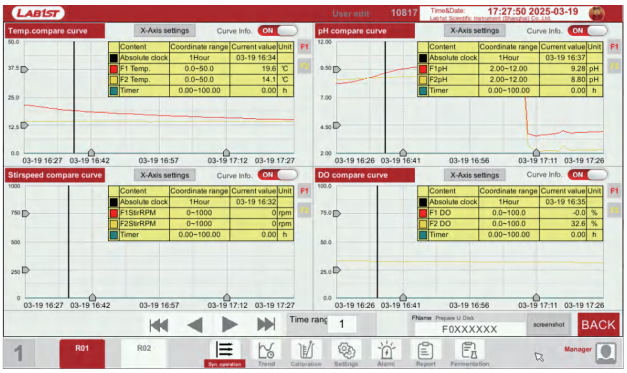
- The complete kit includes everything needed for the applica-tion, pre-configured, and ready to use, without the need to purchase additional accessories.
- No tools are required, and the user-friendly interface design makes installation simple and simplifies the preparation work before the process starts.
- The separation of the base, vessel body and stirring motor enables a lightweight design, making it easier for experimenters to transfer it to the sterilizer.
- The 10.1-inch touchscreen, combined with a simple and intuitive software design, offers full support for biological processes, making operation no longer complicated.
- All components are located on the vessel lid, allowing for easy disassembly and reassembly, simplifying cleaning and mainte-nance.

Flexible, Reliable, and Fully Integrated System

Software Functions: Precision Control and Full Process Flexibility

- Supporting recipe sharing, synchronized comparison of parameter curves, and synchronized setting and control of parameters, enhances efficiency and consistency in experi-mental design and process optimization.
- Multiple cascades for DO control by means of agitation speed, oxygen bypass, and feed, increasing process control flexibility.
- Up to 24 recipes, with no theoretical upper limit on steps, to achieve automatic operation of the biological process.
- Comprehensive control including manual, automatic, sequential, cascaded, conditional, etc. meets different experi-mental needs.
- Easily perform online calibration for sensor and peristaltic pump ensures accurate and reliable process control.
- Extensible real-time display trend chart for easily viewing your entire biological process
- Complete batch data, alarm and operation records, easy to query, export and backup. With 8G ROM, data can be saved for many years.
- Three-level authority management and upper & lower limit alarm settings reduce risks.
- Wireless and wired LAN communication, easily realize remote monitoring and control





Glass Vessel: Optimal Design for Efficient Cultivation

- The single-wall flat-bottom cylindrical vessel is equipped with a heating base. The stainless steel bottom makes it more sturdy and reliable, and has good heat conduction.
- Electropolished 316L stainless steel, Boro 3.3 high borosilicate glass, EPDM and silicon sealing, clean and hygienic.
- Standard 2:1 height-to-diameter ratio, meeting most mass transfer and heat transfer requirements.
- Sufficient interfaces to meet the installation require-ments of standard accessories and sensors.
- Knurled screw design for quick assembly, easy cleaning and maintenance.

Hardware Configuration: Reliable Performance and High-Quality Components

Gas Flow

- Standard configuration: 4 gas sources for air, O_2, N_2 and CO_2 ,overlay and ring sparger, max. 1vvm, optimized for the cellculture application.
- The combination of rotameter and solenoid valve meets the economical and effective gassing strategy.
- Both the gassing and exhaust are equipped with premium Sartorius PTFE 0.2μm filters to prevent contamination.
- Exhaust through the optimized exhaust condenser helps to recover volatile components and maintain a good cell culture environment.

Stirring & Impeller

- Bottom magnetic stirring, maintenance-free servo mo tor, quick response, no start delay, max. 1000 rpm.
- Standard Elephant ear impeller, optimized for the culture of shear-sensitive cell lines.
- Comb-type defoaming impeller, mechanically eliminates top foam and improves mass transfer.
- The impellers are height-adjustable and detachable, increas-ing flexibility and reducing maintenance costs.

Feeding

- 8 fast-load fixed-speed peristaltic pumps for adding acid, alkali, defoamer and feed, with customizable functions, realize automatic control and metering.

Sensor

- Hamilton® pre-pressurized gel-filled pH sensor with durable PHI glass membrane designed for sterilization.
- Hamilton® Polarographic DO Sensor with FDA-ap-proved dissolved oxygen membrane for hygienic processes.
- German JUMO Pt100 RTD, fast response and durable.
- Conductivity foam sensor realizes automatically adding defoamer through the peristaltic pump, which is stable and reliable.

Compliance

- CE certified, ensuring full compliance with the essential health, safety.

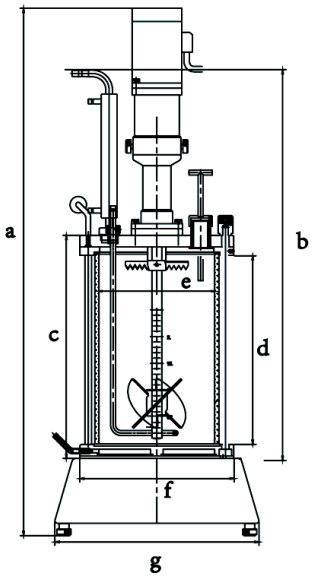
INNOVATIVE BIOREACTOR SOLUTIONS FOR YOUR RESEARCH

Specification - Control Capacity

Independent Control Tower							
Housing Material	Carbon steel, plastic powder coating						
Dimensions [WxDxH, mm]	400×550×760						
Weight [Kg]	Approx. 40 Kg [depending on configuration]						
Display I Operation	10.1" color touch screen						
Controller	Siemens S series PLC, MCGS HMI						
Integrated Pump	8 fixed-speed fast-loading peristaltic pumps						
Flow Meter	10 rotameters						
Communication	USB [software upgrade, data copy and export], Industrial Ethernet, WiFi						
Interface	· 2 x pH sensor cable · 2 x DO sensor cable · 4 x stirring motor control wires · 2 x temperature sensor interface · 2 x foam sensor cable · 2 x heating base control wire interface · 2 x main power interface						
Water Interface	12 × hose barb fitting [inlet/outlet for exhaust condenser, base jacket and chilled water]						
Air Interface	8 × hose barb fitting [4 x gas supply interface, 4 x gas outlet]						
Power Supply	220V (±10%), 50Hz, single phase [optional 110V [± 10%], 60Hz, single phase]						
Adaptable Vessel, Each Vessel	1 L	2 L	3 L	5 L	7 L	10 L	15 L
Rated Power [W], Each Vessel	400	600	800	900	900	1500	1500
Agitation Control							
Motor	Maintenance-free, low noise servo motor						
Speed Range and Accuracy	5 - 1000 rpm, ± 0.5%						
Rated Power [W], Each Vessel	200	400	400	400	400	750	750
Gas Control							
Gas Source	Air, O_2, N_2, CO_2						
Control Method	· Air: rotameter · O_2, N_2, CO_2: rotameter + solenoid valve						
Gas Inlet	Overlay [for air] + ring sparger						
Flow Range	Overlay - Air: max. design 1 vvm Sparger - Air: max. design 0.2 vvm | O_2: max. design 0.2 vvm | N_2: max. design 0.2 vvm | CO_2: max. design 0.2 vvm						
Flow Accuracy	± 4%						
Temperature Control							
Control Method	Robust PID algorithm						
Heating Method	Closed loop system with circulating jacket, bottom electric hot plate						
Heating Power [W], Each Vessel	80	80	200	330	330	550	550
Cooling Method	Tap water or circulating cooling water						
Sensor	Pt100 RTD [JUMO, German]						
Measurement Range and Accuracy	0~150.0°C, ± 0.1°C						
Control Range and Accuracy	8.0 °C above coolant to 40.0 °C above ambient (0-65.0 °C absolute), ± 0.2°C						
PH Control							
Control Method	· Robust PID algorithm · Cascade control with peristaltic pump by adding alkali or solenoid valve by adding CO2						
Sensor	Hamilton Sterilizable Gel-filled pH electrode						
Measurement Range and Accuracy	2.00~12.00, 0.01						
Control Accuracy	± 0.05						
DO Control							
Control Method	· Robust PID algorithm · Cascade control with different parameters [agitation, gas flow and pump]						
Sensor	Hamilton Sterilizable polarographic DO electrode						
Measurement Range and Accuracy	0.0~150.0%, 0.1%						
Control Accuracy	± 3%						
Foam Control							
Control Method	· Cascade control with peristaltic pump by adding antifoam (defoamer) · Mechanical defoaming blade						

Specification - Vessel

Glass Vessel							
Type	Single-wall flat-bottom cylindrical vessel, available for heating base						
Total Volume [L]	1	2	3	5	7	10	15
Max. Working Volume [L]	0.75	1.50	2.25	3.75	5.25	7.50	11.25
Min. Working Volume [L]	0.25	0.50	0.75	1.25	1.75	2.50	3.75
Material [Wetted Part]	· Glass vessel material: Borosilicate 3.3 glass · Vessel cover and inner parts: SUS 316L · Seal: EPDM and Silicon						
Surface Treatment	· Inner surface: electrolytic polishing, Ra ＜0.4 μm · Outer surface: Ra ＜0.6 μm						
Pressure Design	Working pressure: 0~1 bar @ 150°C Autoclavable						
Height to Diameter Ratio [H: D]	Approx. 2:1						
Vessel Dimensions	Refer to "Table A"						
Vessel Weight [Excluding Motor] [Kg]	8	10	11	13	15	17	20
Base Weight [With Bottle Holder] [Kg]	8	8	10	10	10	15	15
Vessel Lid Interface	1 × Agitator flange for bottom magnetic stirring 1 × Flame inoculation port 2 × Baffle port, including cooling coil 1 × Gas inlet port for ring sparger 1 × Exhaust port, including water-cooled exhaust condenser 1 × Sampling port 1 × PH sensor port 1 × DO sensor port 1 × PT100 temperature sensor port 1 × Foam sensor port 1 × Overlay port N × Feeding port						
Impellers	· 2 layers, top: foam breaker, bottom: 3-blade elephant ear impeller · Detachable, height adjustable						
Baffles	None						



* Table A

Dimension							
Vessel volume [L]	1	2	3	5	7	10	15
a [mm]	448	540	637	656	736	840	888
b [mm]	360	430	470	486	522	616	700
c [mm]	205	254	270	286	368	430	470
d [mm]	170	230	230	240	315	380	420
e [mm]	Ø90	Ø110	Ø140	Ø170	Ø170	Ø185	Ø216
f [mm]	156	156	187	220	220	240	275
g [mm]	210	210	248	267	267	300	340
Sterilization Requirement							
Minimum Size [mm]	Ø195x365	Ø195x450	Ø230x475	Ø270x500	Ø270x590	Ø275x645	Ø320x710
Recommended Size	Ø260x400	Ø260x500	Ø300x550	Ø330x550	Ø330x650	Ø330x650	Ø370x750

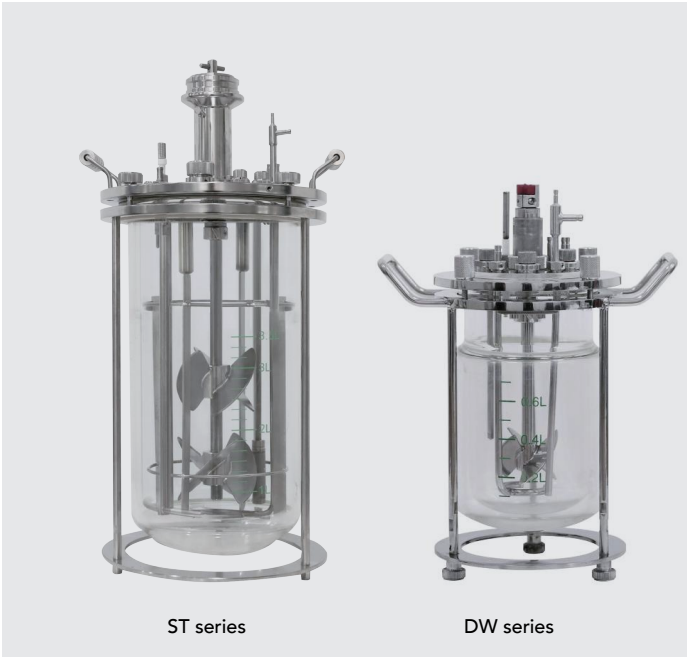
Options & Upgrades

Culture Vessel

Item	Description	Function
ST Series	Single-wall round-bottom cylindrical vessel, available for electric blanket	A variety of vessels to meet different needs
DW Series	Jacketed round-bottom cylindrical vessel, available for water jacket temperature control	

Impeller

Item	Description	Function
Type	Lift impeller, oblique leaf impeller, rotary filter, Marine impeller, Spin filter, packed-bed impeller, etc.	Flexible customization to meet different application requirements



ST series DW series

Sensors

Item	Description	Function
pH Sensors	Hamilton® Arc smart pre-pressurized gel-filled sensor for real-time pH monitoring	Pre-calibrated, ready to use, automatic diagnostics
	Mettler Toledo Brand	More brand choices, adaptable to different systems
DO Sensors	Mettler Toledo Brand	More brand choices, adaptable to different systems
	Hamilton® optical dissolved oxygen sensor	No polarization required, quick start
More Sensors	Mettler Toledo Brand	More brand choices, adaptable to different systems
	Hamilton DCO2 sensor	Online real-time monitoring of carbon dioxide dissolved in liquids
	Hamilton VCD sensor	Online real-time monitoring of viable cell density
	Hamilton OD sensor	Online real-time monitoring of cell turbidity

More Options

Item	Description	Function
Control Cabinet	Stainless steel 304 housing material	More hygienic
HMI	Siemens	International recognition
Pump	Standard variable-speed pump	Supports more complex feeding procedures
	Watson Marlow 114 variable speed pump	International recognition
	Additional external pumps [up to 4 for twin-unit]	Support more in/out materials
Flow Meter	MFC, up to 10pcs for BR100-C2	Realize automatic control of gas flow with higher accuracy and calculate cumulative volume
Communication	SCADA	Integrate systems for powerful real-time monitoring and data analysis
Power Supply	110V (± 10%), 60Hz, single phase	Adapt to voltage standards of different countries and regions
Wetted Part Material	2205 duplex stainless steel/titanium	Tolerant to high salinity environments
Aspect Ratio	1.5:1 | 2.5:1 | 3:1 | Customizable	Flexible customization to meet different application requirements
Stirring Method	Top mechanical stirring | Top magnetic stirring	Magnetic coupling further enhances sealing
Sparger Type	Microsparger	Smaller bubble size, stronger gas-liquid mass transfer efficiency
Adapter	Adapter for sensor height adjustment	Flexible positioning of sensor height to suit different vessel volumes
Sampling	Sterile sampling device	Consist of Luer head, one-way valve, T-joint, needle filter, and sterile syringe, suitable for sterile sampling.
Exhaust Gas Analysis	Exhaust gas analyzer for O_2 and CO_2	Online real-time detection of CO_2 and O_2 in exhaust gas, analysis of respiratory metabolic parameters CER/OUR/RQ
Exhaust Gas Heating	Exhaust heater	Heating the exhaust gas filter to avoid filter clogging
Weighing	Vessel weighing | Feed weighing	Weight measurement for level control
Light	Red, blue and white, or customizable; Fixed or adjustable light intensity (0-100%)	Optimize light conditions to significantly enhance cell density and biomass yield of photosynthetic organisms
Qualification	IQ/OQ documentation	Meet compliance requirements
Certification	Comply with ASME BPE, UL and other certifications	Meet the certification requirements of different countries and regions

- MFC

- Watson Marlow Peristaltic Pump

- OHAUS Scales

- Sensor Height Adapter

- Red, Blue and White Light